

## Vitamins and antioxidants

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The levels of glutathione peroxidase, vitamin A, E, C and lipid peroxidation in patients with transitional cell carcinoma of the bladder O. Yalçin' F. Karatas

F.A. Erulas; E. Özdemir

Abstract :

### OBJECTIVE

To assess the levels of erythrocyte glutathione peroxidase (GSH-Px), and the serum levels of antioxidant vitamins (A, E and C), selenium and malondialdehyde (MDA) in patients with transitional cell carcinoma (TCC) of the bladder.

### PATIENTS, SUBJECTS AND METHODS

The study comprised 91 people (23 healthy controls and 68 patients with TCC). Erythrocyte GSH-Px activity was measured by spectrophotometry, high-performance liquid chromatography to detect serum levels of vitamins and MDA, and fluorometry to detect serum levels of selenium.

### RESULTS

The serum levels of vitamin A, E and C, and selenium were significantly lower ( $P < 0.05$ ) in patients with TCC than in controls. However, erythrocyte GSH-Px activities ( $P < 0.05$ ) and serum MDA levels ( $P < 0.01$ ) were significantly higher in patients with TCC than in the controls.

### CONCLUSIONS

Levels of free oxygen species were higher, and antioxidant vitamin and selenium levels lower, in patients with bladder TCC than in controls. These findings, with the results of previous animal studies, suggest that giving vitamin A, C, E and selenium may be beneficial in preventing and treating human bladder cancer.

BJU International, Volume 93: Issue 6 2004 PubMed

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Update March-2004-Vitamin E protects against prostate and bladder cancer below

The subject of cancer and vitamins/supplements is controversial. Concerns about possible negative side effects of antioxidants for those who have undergone cystectomy and/or chemo patients have been reported.

Bad news? Update 2007

A 2007 JAMA paper could almost be called an anti-anti-oxidant article, wherein the authors found a connection between the use of antioxidants and cancer death; "Conclusions: Treatment with beta carotene, vitamin A, and vitamin E may increase mortality. The potential roles of vitamin C and selenium on mortality need further study. Mortality in Randomized Trials of Antioxidant Supplements for Primary and Secondary Prevention Systematic Review and Meta-analysis Goran Bjelakovic, MD, DrMedSci; Dimitrinka Nikolova, MA; Lise Lotte Gluud, MD, DrMedSci; Rosa G. Simonetti, MD; Christian Gluud, MD, DrMedSci JAMA. 2007;297:842-857. PUBMED

From pro-active cancer survivor Pete Granger:

" In particular, one should be wary about taking high doses of anything when a tumor is active. It is a lot safer to take supplements of any kind when

NED [no evidence of disease or "remission"]. This may particularly apply to beta carotene and folate supplements - with the latter requiring (in any event) adequate concurrent vitamin B12."

Promising results in animal study, 2006:

Vitamins C and K3 sensitize human urothelial tumors to gemcitabine.

J Urol. 2006 Oct;176(4 Pt 1):1642-7. Kassouf W, \* Highshaw R, \* Nelkin GM, \* Dinney CP, \* Kamat AM. Department of Urology, University of Texas M. D. Anderson Cancer Center, Houston, Texas 77030, USA. PubMed Conclusions: Vitamins C and K3 have significant antiproliferative and apoptotic effects when used in combination. This combination enhances the efficacy of gemcitabine against bladder cancer in vivo.

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It is well known that the correct combination of vitamins and supplements is extremely important. That is one of the reasons why it's wise to get professional advice before beginning a regimen. Some patients get a consult from a professional naturopath or nutritionist, and if you can afford it, it's a sensible way to go. Blood work is done to determine a regimen in accordance with an individual's needs.

It is always desirable to discuss everything you are either taking, or considering taking, with the physician in charge of your case, as many vitamins, supplements and herbs can also have an undesirable interaction with drugs or treatment.

## Antioxidants

As the name implies, an antioxidant protects the body from the effects of oxidation from oxygen. During the normal process of converting nutrients to energy (called metabolism), the body creates free radicals; they also enter the body through toxins in foods. Free radicals are atoms with an unpaired electron which easily combine with other molecules in the body causing random chemical reactions (oxidation).

If the formation of free radicals is left unchecked, the effects of oxidation can accumulate over time and damage the body in various ways. This damage from oxidation has been associated with signs of aging and with chronic degenerative diseases such as arthritis, heart disease, and cancer.

One of the primary ways that the healthy body intercepts free radicals before they do any damage is with antioxidants, which 'mop up' or neutralize free radicals (by eliminating the unpaired electron) so that they can no longer cause damaging chemical reactions. Presumably, lycopene, among other free radical scavengers, if present in adequate amounts, can help protect the body against free radical damage. Studies have shown that lycopene is more than twice as effective as beta carotene (see nutrition).<sup>1</sup>

The number one cause of cancer is damage to the DNA, most specifically the the P-53 gene. This damage is most commonly done by free radicals. This free radical generally exists for only a few thousandths of a second before it is neutralized. If it neutralizes itself by grabbing onto an electron from the DNA, then that leaves the DNA damaged. If the p-53 gene receives the damage, then when a new cell is formed the parent cell refuses to die and get out of the way and continues to reproduce and a cancerous tumor is formed. It's speculated that antioxidants in the cell and outside the cell in the body fluids can neutralize the free radical before it can do any damage.  
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Free radicals are caused by the living process of burning our food and by contaminants [carcinogens] in our bodies. The cleaner the burning process the fewer the free radicals, but all living creates free radicals. Well trained athletes for example step up their anti-oxidant intake before and after strenuous exercises to neutralize the free radicals given off by the exercise. Vitamin C is an antioxidant working in the fluids that surround the cell. Vitamin E is fat soluble and works inside the cell. These antioxidants must be in place in sufficient quantities at all times to lower the free radical damage. Other antioxidants also help and many are even more powerful than the two vitamins mentioned, but the body needs both the fat soluble and water soluble antioxidants. Flax seed oil, Evening primrose, Vit A, Beta carotene, and fish oils are good fat soluble sources. Vit C, Grape seed extract, melatonin and MSM are good water soluble sources. This all helps prevent cancer. The anti-Vitamin C crowd assumes that Vitamin C is for nutritional functions only and dismisses the antioxidant properties. They point out that Dr. Linus Pauling, who started the Vitamin C fad, died of Cancer and so did his wife. What they fail to mention is that both were in their high 90's at death and had kept their cancers at bay for over 40 years.<sup>2</sup>

Antioxidants are for prevention. Once the cancer has begun then the doctors step in to destroy the tumors. But free radical damage is happening at all times, and every day new cancerous cells are formed in every body, though for the most part the body destroys them. It is the body's own immune system that destroys these mutations. If more mutations happen than the immune system can handle, then tumors begin and we call this condition cancer. So if we keep the balance in our favour by lowering the incidence of mutations and helping to keep the immune system 'up to speed', the cancers can be kept at bay.<sup>2</sup>

Some antioxidants commonly used in cancer prevention and treatment are;

Vitamin A and beta carotene

Vitamin C, E

Zinc

Green Tea

Grape Seed Extract

Selenium

Coenzyme Q10

Cysteine

Gingko Biloba

In the interest of convenience, there are also many powerful multi antioxidant products available. Some reliable ones would include;

ACES+Zinc and ACES+Selenium from Carlson Laboratories;

Advanced Carotenoid Complex from Solgar;

Body Language Super Antioxidant from OxyFresh USA;

Cell Guard from Biotec Food Corporation;

Life Guard form Thompson Nutritional Products;

Oxy-5000 Forte from American Biologics.

Oncovite from Mission Pharmacal, is a high antioxidant formula that has been specifically designed for bladder cancer patients, and has been studied in clinical trials.

For the record, my sister had blood work done by a professional nutritionist in NYC, who said that 2,000-4,000 mg of vitamin C is her treatment to prevent recurrence of superficial tumors. I am not endorsing this regimen, but just putting it here for the curious. My sister spent a few hundred dollars (including the lab/blood work) for this info. Her nutritionist put her on;

Black current Seed Oil Caps (2xday)

CoQ Softgel 100 mgs (2xday)

Supergram 11 vitamin C 1000mgs (2xday)

Dr. Franks Hi-Power Multi (6xday)

That is a fairly simple list of supplements according to most 'pro alternative' sources, but this regimen takes into account that my sister has thyroid problems and is on medication for that, which changes things quite a bit. Before the thyroid problems started, this same nutritionist had put my sister on a much more extensive vitamin and supplement regimen.

For more information and links to get further on the subject of alternative approaches including vitamins and supplements, see also alternatives/resources and immune boosters.

Antioxidant concerns for chemo/cystectomy patients?

There is some confusion regarding the use of antioxidants during chemo.

Many sources will tell you that anti oxidants will help fight cancer, and a Medline search will pull up scores of studies that suggest this is true. However, recently oncology researchers have begun theorizing over possible dangers with antioxidant use during chemotherapy or radiation treatments.

## Con

Recent research in apoptosis or the programmed death of cells supports the stance that too much antioxidant may interfere with the process and protect the pre cancerous cells. Some chemotherapy drugs work by inducing apoptosis and in theory, use of antioxidant vitamins in these patients could potentially interfere with treatment.

In an article entitled; Cancer Tumors Shown to Consume Large Amounts of Vitamin C, Memorial Sloan Kettering Cancer Center in NYC put out this information;

"Researchers are cautious about cancer patients taking vitamin C supplements....Although the role that vitamin C plays in tumors is not yet known, recent studies have shown that there may be possible interactions between dietary antioxidants and chemotherapy treatment. Vitamin C is a powerful antioxidant that consumes free radicals – or toxic substances in the body that can also be generated from chemotherapy agents to destroy cancer cells."

One of the researcher at the institute goes on to say that it's possible that large amounts of vitamin C could interfere the oxidative mechanisms of chemotherapy or radiation by lessening it's effects. Sept.15 1999 <http://www.mskcc.org/ti.htm> for whole article.

John E. Bigalow and colleagues at the University of Pennsylvania in Philadelphia suggest that antioxidants interfere with the ability of radiation and chemotherapy to kill cancer cells. By recommending that patients stop taking antioxidant vitamins a few days prior to radiation they hope to improve the kill rate of the radicals generated by the radiation or drug treatment.

## Pro

Science writer Ralph Moss, Ph.D claims that the theory put forth by oncology professionals is just that; a theory. He reviews a wealth of studies in his upcoming book, 'Antioxidants Against Cancer', which strongly suggest that these theories stated above may be unfounded, and that the evidence has already shown that antioxidants not only don't interfere with efficacy, but help patients to heal faster after treatment.

Bladder cancer Warriors are eager to get a clear answer regarding these concerns.

Use of vitamins may not be without risk. Several claims of adverse effects have been proven to be without foundation, such as;

1. Large doses of vitamin C result in low plasma levels of vitamin B12.

2. Discontinuation of high dose vitamin C supplementation can cause 'rebound scurvy'.

3. High vitamin C increases oxalate excretion in the urine and contributes to kidney stones.

4. Vitamin C is mutagenic.

High doses of vitamin C, however, can interfere with certain laboratory tests for glucose, uric acid, creatinine and inorganic phosphate and can interfere with the detection of occult blood in feces. Clinicians are advised to discuss these possibilities with patients and suggest discontinuation of the supplement several days prior to testing.<sup>3</sup>

For the full article go to the BC guide <http://www.bccancer.bc.ca>  
Unconventional Cancer Therapies: Manual for Patients

For bladder cancer patients who have undergone cystectomy, protecting the kidneys is very important. The National Kidney Cancer Association warns against self medication, especially mega doses. Although it acknowledges Dr. Lamm's success with his Oncovite trials, it goes on to say that "Patients should exercise extreme caution in using vitamins. Supplements which contain vitamin A may interact with some drugs to produce unwanted side effects and toxicity... Drugs such as Acutane(R) carry warnings that vitamin supplements should not be used while taking the drug. Supplements containing vitamin A may cause liver toxicity or damage when taken in combination with retinoids...Patients should also recognize that dietary supplements sold in health food stores are not regulated by the US Food and Drug Administration..."

<http://www.nkca.org/selfcare.html>

There are more benefits than dangers to supplementation, yet sometimes people have a tendency to go overboard. Megadosing will not kill you---the American Association of Poison Control Centers reports just one death in 1995-1996 from a vitamin overdose---but it can make you sick to your stomach. A megadose of iron, however, can kill a child -- so be sure to keep adult vitamins out of children's reach.

When supplementing your diet, watch out for the following:

Vitamin A: Doses above 100,000 I.U. (international units) can cause vomiting, blurred vision, and dizziness. Pregnant women should be very careful to get the proper dose, too much or too little can cause birth defects.

Vitamin B-3 (NIACIN): Doses over 2 grams may cause liver damage.

Vitamin C: Too much may cause diarrhea. Individual thresholds vary.

Vitamin D: Doses above 1000 I.U. may cause headache, nausea, fatigue, diarrhea, and possible irreversible kidney and heart problems.

Magnesium: 3000 mg have a laxative effect

Zinc: 1000 mg cause nausea and vomiting 4

Always discuss use of vitamins and supplements, herbs etc. with the professionals involved on your case.

## Vitamin E Protects Against Bladder Cancer

2004

### Form of Vitamin E May Reduce Bladder Cancer

Diet High in Certain Fruits, Vegetables, Oils Suggested

One form of vitamin E appears to offer protection against development of bladder cancer, while a second form has no beneficial effect, say a team of researchers led by M.

D. Anderson, one of the top cancer centers in the US.

In a five-year study, which included 468 newly diagnosed bladder cancer patients and 534 people without cancer, researchers found that high dietary intake of alpha-tocopherol, one form of vitamin E, significantly reduced the risk of developing bladder cancer.

But gamma-tocopherol, which is consumed in greater amounts than alpha-tocopherol in the United States, offered no protection, say the researchers led by Xifeng Wu, M.D., Ph.D., associate professor in the Department of Epidemiology at M. D. Anderson. The research, which was conducted by M. D. Anderson epidemiologists and nutritionists from Texas Woman s University, was presented at the annual meeting of the American Association for Cancer Research March 27-31.

### Diet tips

High intake of vitamin E from dietary sources was associated with a 42% reduced risk of bladder cancer, whereas a high intake of vitamin E from diet and supplements combined reduced the risk by 44%, says the study s first author, Ladia Hernandez, research dietitian in the Department of Epidemiology at M. D. Anderson.

While the study is not over, researchers are recommending that people eat a healthy diet that includes fruit, vegetables and nuts. Many people do not eat the current recommended dietary allowance of 15 milligrams of vitamin E from their diet.

Many foods include both forms of vitamin E, including some vegetables, nuts, fruits and oils.

Researchers say foods richest in alpha-tocopherol include:

## Almonds

Red and green peppers

Spinach

Mustard greens

Sunflower seeds

Vegetable oils (including cottonseed and safflower oils)

Those high in gamma-tocopherol include:

## Walnuts

Pecans

Garbanzo beans

Soybean oil

Previous research tentatively linked low intake of vitamin E to bladder cancer, but those studies did not distinguish between the different forms of vitamin E, which include four tocopherols. Only the alpha and gamma forms of tocopherol are predominately found in food, and because they are metabolized differently, a recent Institute of Medicine report suggested they should be studied separately.

## Research process

To do that, the researchers had to develop a database for the alpha- and gamma-tocopherol contents of 200 different foods, based on an extensive review of published values and their own analytical values for foods like cornbread and french fries. These values were used to estimate the intakes of the two tocopherols in an ongoing study.

Participants answered a detailed food-frequency questionnaire that summed up their dietary habits the year before they were diagnosed with bladder cancer or, in participants without cancer, the year before they agreed to participate in the study. Researchers then factored out other known bladder cancer risks, such as smoking, age, ethnicity and gender, to determine the benefits of the two forms of vitamin E.

Our long-term goal is to identify risk factors that are important for bladder cancer development, Wu says.

More studies are suggesting that different vitamins protect against different forms of cancer, and some point to a benefit from gamma-tocopherol in reducing the risk of developing prostate cancer. Scientists say, however, that more research is needed.

## References

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4. World Health Network; Megadose Hazards <http://www.worldhealth.net/news/vitamin.html>